

What is claimed is:

1. A process for producing a high purity trialkanolamine excelling in hue and having an APHA of not more than 40,  
5 comprising:

a step of producing a mixed alkanolamine by a reaction  
of an alkylene oxide with liquid ammonia in the presence of  
a zeolite catalyst or by the reaction of an alkylene oxide  
with liquid ammonia in the presence of the zeolite catalyst  
10 and a reaction of an alkylene oxide with aqueous ammonia;

a step of removal of a low-boiling substance for removing  
unreacted ammonia, water, a monoalkanolamine, and a  
dialkanolamine from the mixed alkanolamine;

a step of removing a high-boiling substance, which have  
15 a boiling point more than that of the trialkanolamine, by  
subjecting the product deprived of the low-boiling substance  
to vacuum distillation; and

a step of redistilling the distillate obtained by the  
vacuum distillation.

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2. A process according to claim 1, wherein the unreacted  
ammonia is removed by means of a pressure distillation and/or  
nitrogen gas bubbling.

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3. A process according to claim 1, wherein the water,  
the monoalkanolamine, and the dialkanolamine are removed  
continuously or batchwise by a vacuum distillation,  
respectively.

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4. A process according to claim 1, wherein the  
redistillation is performed batchwise.

5. A process according to claim 1, wherein the redistillation is performed using a distillation column of empty.

5        6. A process according to claim 5, wherein a distillate obtained by the redistillation is classified into an initial fraction, an intermediate fraction, and a post fraction, and the intermediate fraction is gathered as a trialkanolamine product.

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7. A process according to claim 6, wherein the distillate is analyzed continuously or intermittently using an analyzer.

15        8. A process according to claim 1, wherein the reaction requires at least part of the mixed alkanolamine to be recycled.

9. A process according to claim 1, wherein the mixed alkanolamine comprises a mono-, di-, and tri-alkanolamine.

20        10. A process according to claim 1, wherein the trialkanolamine is triethanolamine, the alkylene oxide is ethylene oxide, the alkanolamine ethanol amine, the monoalkanolamine is monoethanolamine, and the dialkanolamine is diethanolamine.

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11. A process for refining a trialkanolamine from a mixed alkanolamine obtained by a reaction of an alkylene oxide with ammonia, comprising:

30        a step of removing unreacted ammonia, water, a monoalkanolamine, and a dialkanolamine from the mixed alkanolamine by fraction distillation to form a raw material trialkanolamine;

a step of adding to the raw material trialkanolamine a low-boiling compound having a boiling point less than that of the trialkanolamine prior to distillation; and  
a step of distilling the resultant trialkanolamine.

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12. A process according to claim 11, wherein the low-boiling compound is at least one selected from the group consisting of water; alcohols; ketones; esters; diols; and halogenated hydrocarbons.

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13. A process according to claim 12, wherein the low-boiling compound is at least one selected from the group consisting of water; ethanol, methanol, propyl alcohol, isopropyl alcohol, butyl alcohol, and t-butyl alcohol; acetone and methylethyl ketone; ethylene glycol monoacetate and ethylene glycol monoethyl ether acetate; monoethylene glycol and diethylene glycol; and carbon tetrachloride.

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14. A process according to claim 13, wherein the low-boiling compound is at least one selected from the group consisting of water, the monoalkanolamine, and mixtures thereof.

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15. A process according to claim 11, wherein the unreacted ammonia is removed by means of a pressure distillation and/or nitrogen gas bubbling.

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16. A process according to claim 11, wherein the water, the monoalkanolamine, and the dialkanolamine are removed continuously or batchwise by a vacuum distillation, respectively.

17. A process according to claim 11, wherein the mixed alkanolamine is obtained by a process for producing a mixed alkanolamine by a reaction of an alkylene oxide with liquid ammonia in the presence of a zeolite catalyst or by the reaction 5 of an alkylene oxide with liquid ammonia in the presence of the zeolite catalyst and a reaction of an alkylene oxide with aqueous ammonia.

18. A process according to claim 11, wherein the mixed 10 alkanolamine comprises a mono-, di-, and tri-alkanolamine.

19. A process according to claim 1, wherein the trialkanolamine is triethanolamine, the alkylene oxide ethylene oxide, the alkanolamine ethanol amine, the 15 monoalkanolamine is monoethanolamine, and the dialkanolamine diethanolamine.